



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/081,491	02/22/2002	Rajendra Pendse	CPAC 1008-2 US	1495

22470 7590 08/01/2003

HAYNES BEFFEL & WOLFELD LLP  
P O BOX 366  
HALF MOON BAY, CA 94019

EXAMINER

ROMAN, ANGEL

ART UNIT	PAPER NUMBER
----------	--------------

2812

DATE MAILED: 08/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/081,491

Applicant(s)

PENDSE ET AL. 

Examiner

Angel Roman

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 May 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-22 is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 June 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other:

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 7 and 8 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Chang et al. U.S. Patent 6,365,500 B1.

Chang et al. discloses a flip chip package, comprising an integrated circuit chip 30 having bumps 36 constructed of a material selected to provide low yield strength, high ductility, and an oxidation-and corrosion-resistant bump surface formed of gold on input/output pads 26 in a specified arrangement, and a package substrate 20 having a plurality of bond pads 24 in a complementary arrangement (see figure 1), wherein interconnection between the bumps 36 on the integrated circuit chip 30 and the respective bond pads 24 on the package substrate 20 is established by direct mating of the bump surfaces with the respective bond pads and thermo-mechanical deformation of the bumps 36 (see figure 2). Chang et al. also discloses a method for forming a flip chip package, comprising providing an integrated circuit chip 30 having interconnect bumps 36 formed on input/output pads 26 in a specified arrangement, each said interconnect bump having low yield strength, high ductility, and an oxidation- and

Art Unit: 2812

corrosion-resistant surface; providing a package substrate 20 having a plurality of bond pads 24 in an arrangement complementary to the specified arrangement of input/output pads 26 on the integrated circuit chip 30 (see figure 1); contacting the bumps 36 with the respective bond pads 24 on the package substrate 20; and thermo-mechanically treating the bumps (thermo-compression bonding) to form solid-state connections of the bumps 36 with their respective bond pads 24 (see figure 2). The thermo-mechanically treating step comprises concurrently forcing the bump against the pad and heating the bump and pad (see Abstract).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 2812

5. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. U.S. Patent 6,365,500 B1.

Chang is applied as above but lacks anticipation on disclosing bump formation processes comprising stud bumping, solder bumping or electroplating. Selecting a bump formation processes comprising stud bumping, solder bumping or electroplating to form the bumps in the primary reference of Chang et al. is only considered to be routine optimization of the method and device disclosed in the primary reference of Chang et al. that a person having ordinary skills in the art at the time the invention was made would have found obvious to select by performing routine experimentation based on a desire accuracy and manufacturing costs since Chang et al. is already suggesting forming the bumps.

#### ***Response to Arguments***

6. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

7. Applicant's arguments, see pages 5-7, filed 05/06/03, with respect to claims 9-22 have been fully considered and are persuasive. The rejection of claims 9-22 has been withdrawn.

Art Unit: 2812

***Allowable Subject Matter***

8. Claims 9-22 are allowed.

9. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record failed to anticipate or render obvious the limitations of having regions of the fill volume with lower specific elastic modules fill material overlying the second interconnect levels connection sites as required by claim 9 and locating the second level interconnects defining a plurality of first fill zones as required by claim 20.

***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gotoh et al. discloses a method of forming a semiconductor package device by thermo-mechanical deformation of gold bumps on a chip to bond the chip to a package substrate.

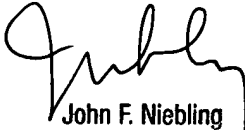
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angel Roman whose telephone number is (703) 306-0207. The examiner can normally be reached on Monday-Friday 8:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (703) 308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Art Unit: 2812

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

AR  
July 27, 2003

  
John F. Niebling  
Supervisory Patent Examiner  
Technology Center 2800